

Worksheet 9.3: Trapezoids

$$A = \left(\frac{b_1 + b_2}{2} \right) h$$

Exercise 1- 8 refer to trapezoids. Complete the table.

	1.	2.	3.	4.	5.	6.	7.	8.
b_1	16	8	10.4	45	36	5	14	
b_2	24	12	6.2	15	9			$6x$
h	8	6.4	2.6			5	$18\sqrt{2}$	$10x$
A				300	144	50	$72\sqrt{2}$	$90x^2$

$$A = \left(\frac{8+12}{2} \right) 6.4$$

$$A = 10 \cdot 6.4 = 64$$

$$72\sqrt{2} = \left(\frac{14+b_2}{2} \right) 18\sqrt{2}$$

$$\frac{72\sqrt{2}}{18\sqrt{2}} = \frac{14+b_2}{2} \cdot 2$$

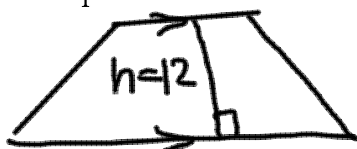
$$2 \cdot 4 = \frac{14+b_2}{2} \cdot 2$$

9. Find the lengths of the medians in the trapezoids in exercises 1-8.

$$8 = 14 + b_2$$

$$-6 = b_2$$

10. A trapezoid has area 108 and height 12. What is the length of its median?



$$A = 108$$

$$m = \frac{b_1 + b_2}{2}$$

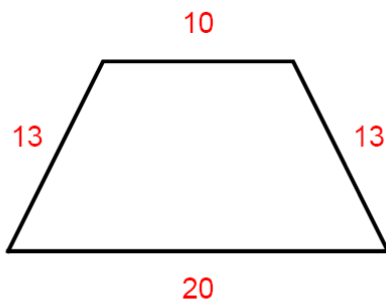
$$A = m \cdot h$$

$$\frac{108}{12} = m \cdot \frac{12}{12}$$

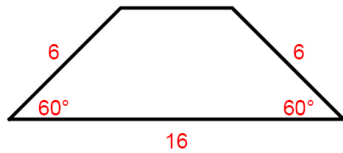
$$m = 9$$

Find the area of each trapezoid.

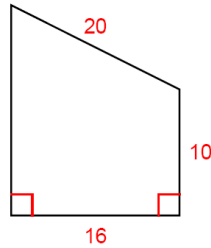
11.



12.



13.



14. The legs of an isosceles trapezoid are 10 units in length and the bases are 9 units and 21 units.

(a) Find the area of the trapezoid.

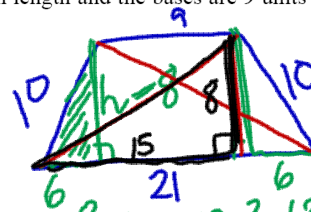
$$A = 15 \cdot 8 = 120$$

(b) Find the lengths of the diagonals.

$$17$$

$$15^2 + 8^2 = d^2 \quad 289 = d^2 \quad 17 = d$$

$$225 + 64 = d^2$$



$$6^2 + h^2 = 10^2 \quad h^2 = 64 \quad h = 8$$

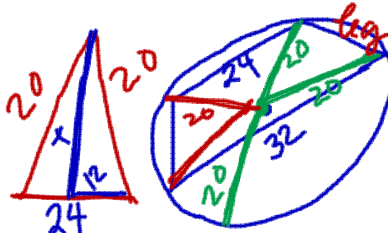
$$36 + h^2 = 100$$

15. An isosceles trapezoid with bases 24 and 32 is inscribed in a circle with radius 20. The center of the circle lies in the interior of the trapezoid. Find the area of the trapezoid.

$$m = 28$$

$$A = mh$$

$$A = 28 \cdot 27.94 \approx 782.32$$



16. Find the area of the trapezoid shown below.

$$12^2 + x^2 = 20^2$$

$$144 + x^2 = 400$$

$$x^2 = 256$$

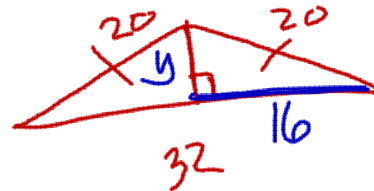
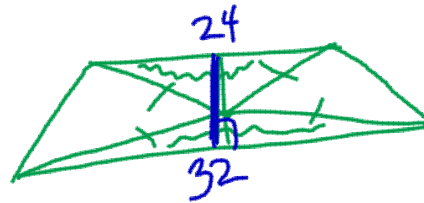
$$x = 15.94$$

$$16^2 + y^2 = 20^2$$

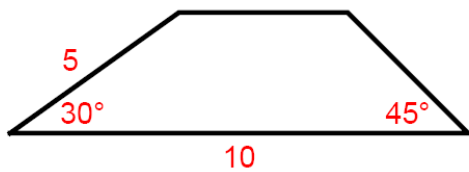
$$256 + y^2 = 400$$

$$y^2 = 144$$

$$y = 12$$



$$h = 27.94$$



17. An isosceles trapezoid with bases 6 and 14 has area 150.

(a) Find the height.

(b) Find the perimeter.

$$\begin{aligned}
 4^2 + 15^2 &= c^2 \\
 16 + 225 &= c^2 \\
 241 &= c^2 \\
 15.5 &= c
 \end{aligned}$$

$A = mh$
 $150 = mh$
 $150 = 10h$
 $15 = h$

$P = 14 + 15.5 + 15.5 + 6$
 $= 51$